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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MENON, KRISHNAN S

ART UNIT

PAPER NUMBER

1723

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,962

Applicant(s)

BAKAJIN ET AL.

Examiner

Krishnan S. Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-11,14 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,9-11,14 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claims 1-7,9-11,14 and 17-20 are pending, of which claims 1-6 and 18-20 are withdrawn from consideration by amendment, 10/14/05.

Specification

Page 7, paragraph 17 of the specification has a blank for the catalyst surface temperature. The temperature must be specified, without introducing new matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 7-10, 12 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by, or in the alternative, under 35 USC 103(a) as being obvious over, Dai et al (US 2004/0149209).

Claims 7: Dai teaches a method of fabricating random, free-grown, carbon nanotube mesh with the nanotubes intertwined and fixedly attached on a substrate as claimed – see figures and paragraphs 27, 40, and 44. Re the carbon nanotubes growing randomly, intertwined and freestanding, see also examples 1 and 2: the carbon

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nanotubes are non-aligned, but normal to the surface and densely packed. Iron catalyst as thin film, CVD growth process – paragraphs 5, 16, 23, 26, 27, 29, 34, 40. With regard to the mesh pore size of 10-200 nm, the reference does not particularly state the mesh pore size. However, this would be inherent from the process, since the process claimed is the same as the process the reference teaches. Applicant's specification also does not seem to have disclosure of any additional process steps specific to the development of the mesh pore size claimed, that is not taught by the reference. The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

Claims 9,10: functionalized by coating, for chemically select or discriminate molecules – see paragraphs 40-44.

Claim 12: nanotube pore size 10-200 nm: Para 2

Claim 14: depositing CVD growth catalyst on substrate, ethylene/hydrogen/argon, 850C, – paragraphs 5 and 29 (temperature), 23 and 34 (H₂/Ar), 26 (alkenes – ethylene is the first alkene), 4 and 27 (catalyst).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al (US 2004/0149209).

Dai teaches all the limitations of claim 7 as given in paragraph 1 above. Claim 17 adds the further limitation of 5 nm thickness to the iron catalyst, which Dai does not teach. However, it would be obvious to one of ordinary skill in the art at the time of invention that the iron catalyst is required only as a nucleating site for the CVD growth, and therefore, very thin, and this could be optimized to obtain strong adhesion. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)

3. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al (US 2004/0149209) as applied to claim 10 above, and further in view of Christel et al (US 6,368,871).

Dai does not teach functionalizing the surfaces of carbon nanotubes by chemical derivatization. Christel teaches chemical derivatization for making the nano-structures ligand-binding entities – see col 9 lines 50-67. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Christel in the teaching of Dai to make the carbon nanotube mesh for protein separation and analysis as taught by Christel.

Response to Arguments

Applicant's arguments filed 10/14/05 have been fully considered but they are not persuasive.

In response to applicant's argument that the Dai or Lee references do not disclose the controlling of CVD pyrolysis parameters to produce such irregularly sized mesh pores of 10-200 nm: neither the claim nor applicant's disclosure seem to have any additional information regarding this 'controlling of CVD pyrolysis' than what is taught in the Dai reference.

Re claims 9 and 10: paragraph 44 teaches applications such as chemical and biological sensors, gas storage, molecular filtration membrane, etc., which require functionalizing. No specific functionalizing is claimed that is not inherently taught by the reference.

Re the pyrolysis parameters in claim 14: this is made clearer in the rejection.

Arguments re claim 17: 5 microns was a typo, which is corrected; this correction does not make any difference in the rejection. With respect to the Christel reference,

the argument that Christel involves micro-structures is not relevant to the issues, because Christel is used for its teaching of derivatized surface.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan S. Menon
Patent Examiner
November 18, 2005


W. L. WALKER
SUPERVISORY PATENT EXAMINER
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